CLAIMS

1. A writing instrument, comprising: a writing instrument body provided with a pen point to be a writing tip end at a front end of a barrel; and a replacement ink cartridge provided with a tubular container having an opened front end and a closed rear end, wherein

the ink cartridge has a plug fitted in an inner circumferential surface of an opening of the container and blocking the opening,

the writing instrument body has a projection pressing the plug rearward when inserted into the opening of the container to release fitting between the plug and the inner circumferential surface of the opening of the container,

the fitting between the plug and the inner circumferential surface of the opening of the container is released in a procedure of attaching the ink cartridge to the writing instrument body, and

the plug blocks the opening of the container again in a procedure of detaching the ink cartridge from the writing instrument body.

2. The writing instrument according to claim 1, wherein the projection and the plug are fitted in the procedure of attaching the ink cartridge to the writing instrument body, and in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the projection and the plug is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

3. The writing instrument according to claim 1 or 2, wherein the inner circumferential surface of the opening of the container is formed in a tapered shape widened rearwardly.

4. The writing instrument according to any one of claims 1 through 3, wherein the projection is an ink-guiding tube having an outer circumferential surface to be air tight fitted in the inner circumferential surface of the opening of the container and the ink-guiding tube has a wall provided with an ink intake portion allowing ink to flow through the ink-guiding tube in a state of fitting in the plug.

5. The writing instrument according to claim 2, wherein any one of the plug and the projection is provided with a male fitting portion and the other is provided with a female fitting portion,

the male fitting portion and the female fitting portion are fitted in the procedure of attaching the ink cartridge to the writing instrument body, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the male fitting portion and the female fitting portion is released

and the plug is fitted again in the inner circumferential surface of the opening of the container.

6. The writing instrument according to claim 5, wherein the male fitting portion is a small protrusion with a diameter less than diameters of the plug and the projection and the female fitting portion is a small bore smaller than the diameters of the plug and the projection,

in the procedure of attaching the ink cartridge to the writing instrument body, the small protrusion is inserted into the small bore and the small protrusion is fitted in the small bore, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the small protrusion and the small bore is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

7. The writing instrument according to claim 6, wherein a part of an outer circumferential surface of the small protrusion is provided with a first shape and a part of an inner circumferential surface of the small bore is provided with a second shape corresponding to the first shape, and

a fitted state of the small protrusion and the small bore is formed by coupling the first shape to the second shape.

8. The writing instrument according to any one of claims 5 through 7, wherein the plug is provided with a plug portion having an outer circumferential surface capable of being fitted in the inner circumferential surface of the opening of the container and an ink intake portion provided in a rear of the plug portion and allowing ink in the container to flow therethrough.

9. The writing instrument according to any one of claims 5 through 8, wherein the inner circumferential surface of the opening of the container includes a cylindrical inner circumferential surface with an identical diameter provided in a front and a tapered inner circumferential surface with a rearwardly increasing diameter continuously provided in a rear of the cylindrical inner circumferential surface.

10. The writing instrument according to claim 5, wherein the projection is an ink-guiding tube having an outer circumferential surface to be air tight fitted in the inner circumferential surface of the opening of the container and a pressing piece partially projecting from a periphery of a wall portion of the ink-guiding tube configures the male fitting portion,

the plug is a plate member fitted in the inner circumferential surface of the opening of the container and a clamping piece provided in a peripheral portion of the plug configures the female fitting portion,

the pressing piece and the clamping piece are fitted in the procedure of attaching the ink cartridge to the writing instrument body, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the pressing piece and the clamping piece is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

11. The writing instrument according to claim 1, comprising:

the ink cartridge including the container in a bottomed cylindrical shape having the opened front end and the closed rear end and the plug fitted into the inner circumferential surface of the opening of the container; and

the projection inserted into the opening of the container to press the plug rearward, thereby opening the plug of the ink cartridge, wherein,

when the ink cartridge is connected, the press opened plug is in a state of approximately making contact with the projection and the plug is approximately clamped by the projection and a part of an inner wall of the container and its movement is suppressed, and,

when the ink cartridge is replaced in a state of the opening of the container oriented downward, the plug moves by its own weight to be locked again in the opening of the container.

12. The writing instrument according to claim 11, wherein a stepped portion is formed in the part of the inner wall of the container, and when the ink cartridge is connected, the stepped portion, together with the projection, restricts the movement of the plug.

13. The writing instrument according to claim 12, wherein the stepped portion is a longitudinal rib formed in the inner wall of the container, a plurality of which are formed in an inner circumference of the container.

14. The writing instrument according to any one of claims 11 through 13, wherein an inner circumference of the opening of the container is formed in a tapered shape widened rearwardly.

15. The writing instrument according to any one of claims 11 through 14, wherein the projection is an ink-guiding tube air tight fitted in an inner circumference of the opening of the container and the ink-guiding tube has a wall provided with an ink intake portion for intake of ink in a state of making contact with the plug.

16. An ink cartridge constituting the writing instrument according to any one of claims 2 through 4, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is, in the procedure of attaching the ink cartridge to the writing

instrument body, pressed rearward by the projection to release the fitting with the inner circumferential surface of the opening of the container and to be fitted in the projection, and,

in the procedure of detaching the ink cartridge from the writing instrument body, releases the fitting with the projection and is fitted again in the inner circumferential surface of the opening of the container.

17. The ink cartridge according to claim 16, wherein the inner circumferential surface of an opening of the container is formed in a tapered shape widened rearwardly.

18. An ink cartridge constituting the writing instrument according to any one of claims 5 through 10, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is provided with any one of the male fitting portion or the female fitting portion, and

the plug is, in the procedure of attaching the ink cartridge to the writing instrument body, pressed rearward by the projection to release the fitting with the inner circumferential surface of the opening of the container and the male fitting portion or the female fitting portion provided in the plug is fitted in the female fitting portion or the male fitting portion provided in the projection, and

in the procedure of detaching the ink cartridge from the writing instrument body, releases fitting between the male fitting portion or the female fitting portion provided in the plug and the female fitting portion or the male fitting portion provided in the projection and is fitted again in the inner circumferential surface of the opening of the container.

19. The ink cartridge according to claim 18, wherein the male fitting portion is a small protrusion with a diameter less than diameters of the plug and the projection and the female fitting portion is a small bore smaller than the diameters of the plug and the projection,

the plug is provided with any one of the small protrusion or the small bore,

in the procedure of attaching the ink cartridge to the writing instrument body, the small protrusion or the small bore provided in the plug is fitted in the small bore or the small protrusion provided in the projection, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the small protrusion or the small bore provided in the plug and the small bore or the small protrusion provided in the projection is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

20. The ink cartridge according to claim 18 or 19, wherein the plug is provided

with a plug portion having an outer circumferential surface capable of being fitted in the inner circumferential surface of the opening of the container and an ink intake portion provided in a rear of the plug portion and allowing ink in the container to flow therethrough.

21. The ink cartridge according to any one of claims 18 through 20, wherein the container is in a cylindrical shape with the opened front end and the closed rear end and has an outer diameter on a front end side to be inserted into a rear end opened area of the barrel of the writing instrument body of 12 mm or less.

22. The ink cartridge according to claim 21, wherein the opening of the container has an inner diameter within a range from 3 to 8 mm.

23. An ink cartridge attachable to the writing instrument body constituting the writing instrument according to any one of claims 11 through 15, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is, when the ink cartridge is connected, in the state of approximately making contact with the projection and is approximately clamped by the projection and a part of an inner wall of the container and its movement is suppressed, and,

when the ink cartridge is replaced in the state of the opening of the container oriented downward, moves by its own weight to be locked again in the opening of the container.

24. An ink cartridge attachable to the writing instrument body constituting the writing instrument according to any one of claims 1 through 15, wherein

at least a front end side of the container has a shape and a dimension attachable in the barrel of the writing instrument body, and when the container is attached in the barrel of the writing instrument body, ink stored in the container is supplied from the opening of the container to the pen point provided at the front end of the barrel of the writing instrument body

25. The ink cartridge according to claim 24, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is, when the projection is inserted into the opening of the container, pressed rearward by the projection to release the fitting with the inner circumferential surface of the opening of the container.

26. The ink cartridge according to claim 24 or 25, wherein the container has an outer circumferential surface formed with a male thread and the male thread is screwed to a female thread formed in an inner circumferential surface of a rear end opened area of the barrel of the writing instrument body.

CLAIMS

1. A writing instrument, comprising: a writing instrument body provided with a pen point to be a writing tip end at a front end of a barrel; and a replacement ink cartridge provided with a tubular container having an opened front end and a closed rear end, wherein

the ink cartridge has a plug fitted in an inner circumferential surface of an opening of the container and blocking the opening,

the writing instrument body has a projection pressing the plug rearward when inserted into the opening of the container to release fitting between the plug and the inner circumferential surface of the opening of the container,

in a procedure of attaching the ink cartridge to the writing instrument body, the projection and the plug are fitted and the fitting between the plug and the inner circumferential surface of the opening of the container is released, and

in a procedure of detaching the ink cartridge from the writing instrument body, fitting between the projection and the plug is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

2. The writing instrument according to claim 1, wherein the inner circumferential surface of the opening of the container is formed in a tapered shape widened rearwardly.

3. The writing instrument according to any one of claim 1 or 2, wherein the projection is an ink-guiding tube having an outer circumferential surface to be air tight fitted in the inner circumferential surface of the opening of the container and the ink-guiding tube has a wall provided with an ink intake portion allowing ink to flow through the ink-guiding tube in a state of fitting in the plug.

4. The writing instrument according to claim 1, wherein any one of the plug and the projection is provided with a male fitting portion and the other is provided with a female fitting portion,

the male fitting portion and the female fitting portion are fitted in the procedure of attaching the ink cartridge to the writing instrument body, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the male fitting portion and the female fitting portion is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

5. The writing instrument according to claim 4, wherein the male fitting portion is a small protrusion with a diameter less than diameters of the plug and the projection and the female fitting portion is a small bore smaller than the diameters of the plug and the projection,

in the procedure of attaching the ink cartridge to the writing instrument body, the small protrusion is inserted into the small bore and the small protrusion is fitted in the small bore, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the small protrusion and the small bore is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

6. The writing instrument according to claim 5, wherein a part of an outer circumferential

surface of the small protrusion is provided with a first shape and a part of an inner circumferential surface of the small bore is provided with a second shape corresponding to the first shape, and

a fitted state of the small protrusion and the small bore is formed by coupling the first shape to the second shape.

7. The writing instrument according to any one of claims 4 through 6, wherein the plug is provided with a plug portion having an outer circumferential surface capable of being fitted in the inner circumferential surface of the opening of the container and an ink intake portion provided in a rear of the plug portion and allowing ink in the container to flow therethrough.

8. The writing instrument according to any one of claims 4 through 7, wherein the inner circumferential surface of the opening of the container includes a cylindrical inner circumferential surface with an identical diameter provided in a front and a tapered inner circumferential surface with a rearwardly increasing diameter continuously provided in a rear of the cylindrical inner circumferential surface.

9. The writing instrument according to claim 7, wherein the projection is an ink-guiding tube having an outer circumferential surface to be air tight fitted in the inner circumferential surface of the opening of the container and a pressing piece partially projecting from a periphery of a wall portion of the ink-guiding tube configures the male fitting portion,

the plug is a plate member fitted in the inner circumferential surface of the opening of the container and a clamping piece provided in a peripheral portion of the plug configures the female fitting portion,

the pressing piece and the clamping piece are fitted in the procedure of attaching the ink cartridge to the writing instrument body, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting between the pressing piece and the clamping piece is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

10. A writing instrument, comprising: a writing instrument body provided with a pen point to be a writing tip end at a front end of a barrel; and a replacement ink cartridge provided with a tubular container having an opened front end and a closed rear end, wherein

the ink cartridge has a plug fitted in an inner circumferential surface of an opening of the container and blocking the opening,

the writing instrument body has a projection pressing the plug rearward when inserted into the opening of the container to release fitting between the plug and the inner circumferential surface of the opening of the container,

when the ink cartridge is connected, the press opened plug is in a state of approximately making contact with the projection and the plug is approximately clamped by the projection and a part of an inner wall of the container and its movement is suppressed, and,

when the ink cartridge is replaced in a state of the opening of the container oriented downward, the plug moves by its own weight to be locked again in the opening of the container.

11. The writing instrument according to claim 10, wherein a stepped portion is formed in the part of the inner wall of the container, and when the ink cartridge is connected, the stepped portion, together with the projection, restricts the movement of the plug.

12. The writing instrument according to claim 11, wherein the stepped portion is a longitudinal rib formed in the inner wall of the container, a plurality of which are formed in an inner circumference of the container.

13. The writing instrument according to any one of claims 10 through 12, wherein an inner circumference of the opening of the container is formed in a tapered shape widened rearwardly.

14. The writing instrument according to any one of claims 10 through 13, wherein the projection is an ink-guiding tube air tight fitted in an inner circumference of the opening of the container and the ink-guiding tube has a wall provided with an ink intake portion for intake of ink in a state of making contact with the plug.

15. An ink cartridge constituting the writing instrument according to any one of claims 1 through 3, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is, in the procedure of attaching the ink cartridge to the writing instrument body, pressed rearward by the projection to release the fitting with the inner circumferential surface of the opening of the container and to be fitted in the projection, and,

in the procedure of detaching the ink cartridge from the writing instrument body, releases the fitting with the projection and is fitted again in the inner circumferential surface of the opening of the container.

16. The ink cartridge according to claim 15, wherein the inner circumferential surface of an opening of the container is formed in a tapered shape widened rearwardly.

17. An ink cartridge constituting the writing instrument according to any one of claims 4 through 9, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is provided with any one of the male fitting portion or the female fitting portion, and

the plug is, in the procedure of attaching the ink cartridge to the writing instrument body, pressed rearward by the projection to release the fitting with the inner circumferential surface of the opening of the container and the male fitting portion or the female fitting portion provided in the plug is fitted in the female fitting portion or the male fitting portion provided in the projection, and

in the procedure of detaching the ink cartridge from the writing instrument body, releases fitting between the male fitting portion or the female fitting portion provided in the plug and the female fitting portion or the male fitting portion provided in the projection and is fitted again in the inner circumferential surface of the opening of the container.

18. The ink cartridge according to claim 17, wherein the male fitting portion is a small protrusion with a diameter less than diameters of the plug and the projection and the female fitting portion is a small bore smaller than the diameters of the plug and the projection,

the plug is provided with any one of the small protrusion or the small bore,

in the procedure of attaching the ink cartridge to the writing instrument body, the small protrusion or the small bore provided in the plug is fitted in the small bore or the small protrusion provided in the projection, and,

in the procedure of detaching the ink cartridge from the writing instrument body, fitting

between the small protrusion or the small bore provided in the plug and the small bore or the small protrusion provided in the projection is released and the plug is fitted again in the inner circumferential surface of the opening of the container.

19. The ink cartridge according to claim 17 or 18, wherein the plug is provided with a plug portion having an outer circumferential surface capable of being fitted in the inner circumferential surface of the opening of the container and an ink intake portion provided in a rear of the plug portion and allowing ink in the container to flow therethrough.

20. The ink cartridge according to any one of claims 17 through 19, wherein the container is in a cylindrical shape with the opened front end and the closed rear end and has an outer diameter on a front end side to be inserted into a rear end opened area of the barrel of the writing instrument body of 12 mm or less.

21. The ink cartridge according to claim 20, wherein the opening of the container has an inner diameter within a range from 3 to 8 mm.

22. An ink cartridge attachable to the writing instrument body constituting the writing instrument according to any one of claims 10 through 14, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is, when the ink cartridge is connected, in the state of approximately making contact with the projection and is approximately clamped by the projection and a part of an inner wall of the container and its movement is suppressed, and,

when the ink cartridge is replaced in the state of the opening of the container oriented downward, moves by its own weight to be locked again in the opening of the container.

23. An ink cartridge attachable to the writing instrument body constituting the writing instrument according to any one of claims 1 through 14, wherein

at least a front end side of the container has a shape and a dimension attachable in the barrel of the writing instrument body, and when the container is attached in the barrel of the writing instrument body, ink stored in the container is supplied from the opening of the container to the pen point provided at the front end of the barrel of the writing instrument body

24. The ink cartridge according to claim 23, having the plug fitted in the inner circumferential surface of the opening of the container, wherein

the plug is, when the projection is inserted into the opening of the container, pressed rearward by the projection to release the fitting with the inner circumferential surface of the opening of the container.

25. The ink cartridge according to claim 23 or 24, wherein the container has an outer circumferential surface formed with a male thread and the male thread is screwed to a female thread formed in an inner circumferential surface of a rear end opened area of the barrel of the writing instrument body.